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ABSTRACT

Several research studies conducted during 1971, designed to better understand and predict behavior variables related to a child's development of academic and social skills, are described. Nowicki Strickland IE scale, including 40 Yes-No questions readable at fifth grade level and understandable to younger children, was used. Reliability and validity data were gathered on more than 1,000 school children in grades three through twelve. Conclusions show a belief in internal control for both males and females in most cases appears related to a number of cognitive and competence behaviors described as attempts to master surrounding environment, including utilization of information about immediate past performance, concept solution, delay of gratification, and persistence at time-consuming and difficult tasks. (NF)

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# LOCUS OF CONTROL AND COMPETENCE IN CHILDREN[1]

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Within the last decade, the locus of control dimension has emerged as a variable of considerable significance in relation to understanding and predicting a number of behaviors ranging from learning in the laboratory to demonstrating in the streets (Lefcourt, 1972a; Rotter, 1966). The bulk of the research has been completed with adults but almost from the beginning of the work in identifying and describing locus of control, researchers have been interested in investigating this variable in relation to a child's development of academic and social skills. A belief in internal control of reinforcement, that is, that the events that happen to an individual are a result of his or her own behavior as opposed to luck, chance, or powers beyond one's personal control and understanding, appears to be an obvious correlate of achievement and mastery behaviors. Of course research with children offers formidable problems in terms of assessment across ages and several attempts to measure locus of control in children were devised.

Battle and Rotter (1963) in the early 1960's developed a projective technique called the Children's Picture Test of Internal-External Control. Like most projective techniques, the Battle-Rotter measure presented problems of administration and scoring, particularly if used with large groups. Also in the late 50's and early 60's, Bialer (1961) revised the adult locus of control scale and developed a brief, simplified measure for children. This scale, however, had some drawbacks of format design and reliability, and there is little validity data available. Certainly the most precise and now widely used locus of control measure for children is one devised by Crandall, Katkovsky & Crandall (1965) which specifically taps a child's belief in his own control of reinforcement in intellectual-academic situations. Consistent findings of significant relationships between a belief in internal control and school achievement are reported for this scale, particularly with males. Steve Nowicki and I (Nowicki and Strickland, 1972) still felt that there was a need for a reliable, easily administered children's scale to tap a generalized expectancy for internal as opposed to external control of reinforcement. About two years ago, we devised a 40 item Yes-No instrument with questions designed to be readable at fifth grade level and understandable to even younger children. Reliability and validity data were gathered on more than 1,000 school children in grades three through twelve. Estimates of internal consistency ranging from .63 to .81 at different grade levels were considered by us to be satisfactory, and test-retest reliabilities, again for different grade levels, ranged from .63 to .71 over a six week period. The scale was found not to be related to social desirability as measured by the Children's Social Desirability Scale (Crandall, Crandall, & Katkovsky, 1965), but was generally related to school achievement scores for males. Early research with the Nowicki-Strickland scale has been reported elsewhere (Nowicki and Barnes, 1972; Nowicki and Roundtree, 1971).

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The purpose of this present paper is to describe the research that has been conducted over the last year with the new scale, which we call the N-S IE. Generally, results have been unusually consistent and we are increasingly encouraged by the avenues of research the measure has opened to us.

Most of the early research, both with the Crandall measure and with our scale, has been aimed at relating a belief in internal control to academic achievement behaviors in children. During the last year, several further studies have confirmed the previous results. Nowicki & Walker (1972b) with a sample of fifth and sixth grade black and white children found achievement indices such as Metropolitan Achievement test scores and grade points averages to be related to internal locus of control. In a large scale project directed by Felix Martin (1972), significant correlations for 7th and 8th grade male students, generally in the -.30's and -.40's, were found between N-S IE scores and reading, math, and language grade placement as well as work study skills and composite achievement. Although relationships between IE scores and achievement measures for females were generally nonsignificant, internal scores for both males and females were significantly related to a measure of academic self-concept. As in the past, IE scores were not related to social desirability.

The discrepant IE-achievement results between males and females, as always, raises a number of questions. To consider sex differences further, Nowicki and Walker (1972a) collected both N-S IE and Children's Social Desirability scale scores on 40 male and 38 female 3rd graders. They found significant three way interactions for achievement scores across sex, locus of control, and social desirability. Subsequent analysis indicated that internal females with low social desirability scores had significantly higher achievement scores than external females with low social desirability scores. There were no differences among females with high social desirability scores nor among any of the male groups. These results suggest that female students who are not so concerned about or dependent upon others for approval, thus not accepting of the stereotyped female role even as early as the third grade, and who do hold a belief in internal locus of control, perform academically like males. Nowicki and Walker are suggesting that in spite of the lack of relationships between N-S IE and social desirability, female achievement-IE relationships may be confounded by the conflicting role demands for the female and her response to these demands.

In further attempts to delineate those cognitive and motivational variables in relation to IE that may lead a child to develop adequate school-related skills, Ludwigsen (1972) administered concept formation tasks to 11 and 12 year old children under reinforcement, verbalization and control contitions. Her results indicated that over all conditions with IQ controlled, internals as measured by the N-S IE, had significantly higher rates of concept problems solution and appeared to go about gathering information about task solution more efficiently than externals. These findings are, of course, in keeping with the research that Lefcourt (Lefcourt, 1972; Lefcourt and Wine, 1969) and others are presenting with adults suggesting that internals are more perceptually and cognitively alert than externals.

Waters, (1971) after collecting N-S IE, Wechsler Block Design scores and a brief IQ measure, individually examined 40 male and 40 female 4th and 5th graders on a difficult wooden puzzle which they were asked to assemble. Half the subjects worked under skill conditions, that is they were told that how well they did on

the puzzle was dependent on their skill, while the other half were told that completion of the puzzle was a matter of luck or chance. Twelve subjects completed the puzzle and their data were not used. Responses of the remaining subjects were analyzed across two dependent measures, namely persistance time and attention breaks. Block Design and IQ scores were not related to locus of control or the dependent measures, however, as predicted, male internals persisted longer at the task under skill instructions and male externals under chance instructions. External females gave a significantly greater incidence of attention breaks than did any of the other groups. Generally, these results suggest that motivation to persist at a difficult and time consuming task is clearly related, possibly dependent upon, both generalized and situation-specific expectancies about contingencies of reinforcement.

Moving to more varied competence behaviors, Martin (1972) found that external children were significantly more likely to be identified by teachers as behavior problems than were internals. Strickland (1972b) with 3rd, 4th and 5th graders as she had shown with 9th graders (1972a) found a relationship between internality and the choosing of a delayed, more valuable reward as opposed to immediate rewards. Williams, in a large scale study with 9th graders, found that for females greater cigarette smoking was related to a belief in external control (1972b), reported seat belt use was related to internal control, (1972a) and preventive dental care, that is, check-ups even if teeth or gums were not painful, was also related to internal control (1972c).

Some data of particular interest in regard to understanding expectancy and competence behaviors in children is that relating N-S IE to aspiration estimates following success and failure. With white, middle-class 6th grade males, Strickland (1972c) found a belief in internal control to be related to adaptive, realistic estimates of future success following performance on a perceived skill task. Strickland (1972d) replicated this finding with a group of 9-12 year old males of varied and mixed ethnic backgrounds whose families were living in lower income housing. Across each of these groups, external males were more likely to give unusual and erratic estimates of immediate future success even with the knowledge of their immediate performance before them. For instance, they would more often than internals go up after failure or lower their estimates following success. These results suggest that male children with an external locus of control orientation are utilizing immediate past information about their performance in a different way from internal males who may be more likely to perceive behavior-reinforcement contingencies as causally connected.

One additional study, not specifically related to competence, does lend added construct validation to the N-S IE and supports the work of Strickland and Hill (1972) who found that male children with severe reading problems were significantly more likely to be external than a matched control sample. Thomas (1972) tested 20 4th grade children with cerebral palsy and found them to be significantly more external than a control sample. Both of these studies suggest that children handicapped to some significant degree are more likely to perceive the events of the world around them as beyond their personal control and understanding. While this belief may be realistic for a severely handicapped child, nonetheless, if a belief in internal control of reinforcement is related to mastery behaviors, then it would seem important to emerge the child in success experiences over which he has some control with the hope that he might move toward a more internal orientation. Efforts in this direction must of course be conducted within the realistic demands of the environment.

In considering attempts to modify or change locus of control orientation, several studies have been completed or are in progress. In a large scale behavior modification program (Edwards, 1970-1972), conducted among elementary school children and teachers over the academic year 1970-71, mean locus of control scale scores moved toward an external direction. The project directors suspected that this external shift was due, in part, to the wide use of group contingencies by teachers who were reinforcing desirable social and academic behaviors. So for the following academic year, a more highly individualized system was established. Behavior reinforcement programs were designed for each child and more attention was directed to the individual. Before the program began, children were pretested for reading achievement and locus of control in early October, 1971. Post-testing was completed in early May, 1972 after seven months of instruction and behavior modification. While the data analyses are still in progress, preliminary results are available on one third grade class and their teacher who was rated superior by project staff and consultants on her efforts to implement the project objectives. With an N of 30, achievement test scores went from grade level 2.63 to 5.26 and the N-S IE scores shifted in an internal direction from 17.63 (sd = 3.92) to 8.39 (sd = 4.65). In another study, Beckstrand (1972) examined changes in achievement and N-S IE scores after one semester during which 11th and 12th grade students were engaged in Transactional Analysis. He found a significant change in locus of control scores in the internal direction although the predicted achievement results were not significantly different when compared to a control group. Beckstrand mentions several drawbacks to his study including a relatively short time span and the fact that once teachers began to become more interested and involved in Transactional Analysis themselves, their attitudes toward all of their students and toward other teachers appeared to change possibly confounding the design.

During the last year, Nowicki and Duke (1972) have obtained extensive reliability and validity data on the adult version of the N-S IE scale. Their interest in the adult scale arose from several considerations. The N-S IE is language appropriate for subcollege educated adults, does not seem to be confounded by personal and ideological causation discrepancies, and is not related to social desirability. All of these considerations have been frequent criticisms of the widely used Rotter scale. And, of perhaps most importance, the adult version of the N-S IE scale is only slightly altered from the children's form thus allowing for ease of developmental and parent-child comparisons. In using this scale, Segal and Nowicki (1972) asked 120 college subjects to complete the adult N-S IE scale and then to complete the scale as they thought their parents would. Subjects also answered a number of Likert type statements pertaining to their parents' nurturing behavior. For all subjects, perceived parental locus of control (both mothers and fathers) were significantly related to subject's locus of control score (.38 and .56, $p < .01$). For females, internality was related to perception of each parent as more nurturant, affectionate and trustworthy. Research is currently underway to examine relationships between actual parent and child scores on the two versions of the scale.

In considering achievement in relation to locus of control with the adult scale, Pappas & Nowicki (1972) and his colleagues consistently find differential results for males and females. While N-S IE scores are not related to college entrance board examination scores, internal males are significantly more likely to make higher college grades than externals. These results are in contrast to the female students where the more external the girl the more likely she is to have higher grades. Nowicki interprets these findings as influenced by perceived sex-role demands on women which may lead women to answer in the external direction

even though their general achievement orientation is similar to the internal males. Again, as with the younger children, further consideration of need for approval, dependency, and Horner's "fear of success" may help in identifying those rather complex mediational variables that appear to be operating for females.

Other late studies with the adult scale have shown externality to be related to Eysenck's Neuroticism Scale (Males $r = .33$ $p < .10$; females $r = 3.9$ $p < .05$) and Taylor Manifest Anxiety Scale scores (males $r = .28$ $p < .10$; females $r = .46$ $p < .05$) (Freides, 1972). Duke and Mullins (1972) investigated locus of control orientation among hospitalized psychiatric patients. They found, as predicted, that hospitalized female schizophrenic patients were significantly more external than hospitalized non-schizophrenic patients who in turn were more external than the control group. Finally, Weaver (1972) tested patients who were using kidney machines to stay alive in an effort to identify personal characteristics of those patients who effectively utilize the machines as opposed to those patients who do not comply with diet restrictions or "forget" to obtain kidney machine appointments and the like. Since there are only enough machines currently in existence to treat about 10% of those patients with kidney disorders who need to use the machines, it is crucially important, in fact a life and death matter, to choose patients who will take advantage of the treatment at this time. She found that a belief in internal control of reinforcement, as measured by the adult version of the scale, was significantly related to greater compliance to treatment demands across three different groups.

Research on locus of control with the new scale continues on many fronts. In summary, it appears that we have an instrument which is generally not related to traditional intelligence measures nor social desirability but does appear to predict academic achievement particularly for males. Additionally, a belief in internal control for both males and females in most cases, appears to be related to a number of cognitive and competence behaviors which can be described as attempts to master the surrounding environment including utilization of information about immediate past performance, concept solution, delay of gratification, persistance at time-consuming and difficult tasks and even compliance to treatment demands that mean the difference between life and death.

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